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How to boost Wi-fi signal; Get better Wi-Fi speed and range and fix Wi-Fi problems

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Everyone needs faster, stronger Wi-Fi. You rely on your [broadband](#) connection for more than ever before. These days we don't just surf the web from a single [PC](#) in one place - we stream music, radio and movies around multiple connected devices, around the home and in the garden. In this article we explain why you may need to upgrade your Wi-Fi equipment. We also show you how to boost your Wi-Fi signal using your existing kit, and simple ways to make your broadband faster, more stable, go further, and be more secure. See also: [Best 802.11ac routers](#).

(Based on an original article by Mike Bedford.) Read: [How to improve Wi-Fi in the home 2015](#).

Boost Wi-Fi signal: understand Wi-Fi standards

Your wireless broadband will work only as fast as the slowest part of the chain - the signal you receive down the line depends on the quality of the line and the service you pay for. Beyond upgrading or moving house the things you can control are your [router](#) and your [laptop](#), [PC](#) or [tablet](#). (See also: [Are you getting a fair deal from your ISP?](#))

If you're buying a new laptop, make sure it supports 802.11n or even 802.11ac wireless. The 802.11n standard has various options, with headline speeds up to 600Mbps. The newly arrived 802.11ac boasts headline figures up to 1.3Gbps. But few routers are able to take advantage of this at this stage, but you might find your ISP-provided router supports 802.11ac if you got it recently: the BT Home Hub 5 (pictured above) supports the standard and also works with VDSL broadband, the type used for BT Infinity. Enthusiasts should get a router that supports the latest standard, but for now 802.11n is a good start.

Wireless networking equipment adheres to various standards, which are created by the Institute of Electrical and Electronic Engineers (IEEE) to ensure interoperability between kit from different manufacturers.

Excluding the obsolete ones, the standards that relate to Wi-Fi are 802.11g, 802.11n and 802.11ac. The latter is brand-new and, although you can buy 'ac' equipment, it's unlikely that your whole setup will be able to take advantage of its speeds. Each standard specifies the headline speed, measured in megabits per second (Mbps). The headline figures aren't representative of what you'll see in practice, but they do allow comparisons to be made.

Remember that if you decide to upgrade your equipment, both the wireless router and your computer must adhere to the same standard. For example, if your laptop supports only 802.11g, upgrading to an 802.11n router won't boost performance, although it might increase the range. In this scenario, you'd also need an 802.11n USB adaptor for your laptop.

802.11g has a headline speed of 54Mbps. This standard has largely been phased out in favour of 802.11n, but you may still be using 802.11g if your computer is more than a couple of years old. That's why we suggest upgrading to an 802.11n laptop if your Wi-Fi is being broadcast from an 802.11n router (which it almost certainly is). Check both router and computers - both sides of the bargain will work only at the speed of the slowest link in the chain.



Boost Wi-Fi signal: Remove obstructions, improve range

The real-world speed you'll get from equipment adhering to a particular Wi-Fi standard is about half the headline figure at best. What's more, it reduces with distance, and with the number of walls and floors between the router and PC. For example, while 802.11g offers 54Mbps, you'll achieve only 25- to 30Mbps when your PC is next to the router, and much less the further away it is placed. At the limit of the equipment's range, just before the connection is lost, the actual speed may well be less than 1Mbps.

Placing your router in a spot that is close to the phone connection is important, as distance from the exchange means a loss of signal. But the further you are from the router itself the worse will be the signal you receive.

It's not uncommon to find that your Wi-Fi network doesn't reach every corner of the house, especially if some of the internal walls are brick or block construction, as opposed to plasterboard. Extending the range can be carried out in several ways, some of which won't cost you a penny.

First, coverage will be improved if you are able to position your wireless router as close to the centre of the building as possible. Remember that it doesn't have to be positioned by the telephone company's master socket; you could also plug a router into any extension socket. (Note, though that you might end up with slower broadband speeds if you do this.)

If the router was previously hardwired to a desktop PC (or other gadgets) without Wi-Fi capabilities, and the wireless router's new home is somewhere else, bear in mind that you will need to get a wireless adaptor or powerline network adaptors to reconnect to the web those devices.

Another option is to increase the range of your wireless router. Some models have removable antennae, in which case you could buy high-gain antennae to replace the standard versions.

Alternatively, you can try mounting your router higher up, rather than have it languishing on the floor or behind the sofa. If all else fails, you might have to buy a wireless range extender and position it to cover a different part of the house from the wireless router. These units operate by retransmitting the signal.

Of course, distance and obstructions such as walls and floors aren't the only things that will reduce wireless speeds. Another likely culprit is interference from nearby wireless equipment that uses the same channel.



Boost Wi-Fi signal: radio bands

Two radio bands are used for wireless internet: 2.4- and 5GHz. 802.11g equipment will operate only on 2.4GHz, while 802.11ac supports only 5GHz; 802.11n permits operation in both bands, and many equipment manufacturers let you choose which frequency to use. Before you make a choice over 2.4- and 5GHz, it pays to understand the pros and cons of each.

The 2.4GHz band has just 13 channels, nine of which are overlapping, while 5GHz has many more. You stand a much greater chance of avoiding interference from other users in the 5GHz band. This, in turn, will make your connection more stable and faster. This is particularly important if you want to use channel bonding to achieve the highest speed 802.11n offers.

As the name suggests, channel bonding uses two 20MHz channels to create a 40MHz channel, theoretically doubling the speed. The problem is that using 40MHz channels reduces the number of non-overlapping channels to just two. In turn, this means that interference with your neighbours' Wi-Fi equipment is much more likely, leading to poor transfer speeds and the possibility of the connection dropping out altogether. For this reason all 802.11n routers ship with channel bonding disabled by default. Unless you live in a remote area, using 40MHz bands on 2.4GHz is not recommended.

The extra number of channels in the 5GHz band means that using 40MHz channels is much more of a practical proposition, but some experts are suggesting that before too long the 5GHz band will be as congested as 2.4GHz. 802.11ac, meanwhile, also allows 80- and 160MHz channels.

Rarely does something offer a win-win solution, though, and 5GHz is no exception. A 5GHz signal's range is generally less than that of a 2.4GHz signal, and this is particularly noticeable if it has to pass through floors and walls – concrete is an especially tricky obstacle.

Some manufacturers of 802.11n equipment allow the use of both bands simultaneously, carrying part of the data stream across 2.4GHz and part across 5GHz. This increases the speed beyond that which is available using either band alone.

Boost Wi-Fi signal: Find free channels

As we've said, there are 13 channels available on the 2.4GHz band. Many of these channels overlap, which means equipment using channel 2 would interfere with equipment on channel 3, for example. There are only four channels that do not overlap – 1, 5, 9 and 13 – so many people choose one of these.

By default, many wireless routers are set to automatically select a channel automatically; others allow you to specify the channel. If you're having problems with your Wi-Fi, suffering from poor speed or occasional dropouts, it may pay to change channels.

Rather than adopting a trial-and-error approach, you should check which channels are in wide use in your neighbourhood. Identifying the free channels is easy with inSSIDer, a free utility from MetaGeek (download it from metageek.net).



If you have a router capable of using the 5GHz spectrum, it's likely that you're one of few people in your area to use it. However, if your neighbour has also invested in gear that operates at 5GHz and is using channel bonding, you may still experience problems with interference. Fortunately, inSSIDer can show usage in the 5GHz band too.

Boost Wi-Fi signal: Configure security

Wireless routers have built-in security features to prevent anyone accessing your Wi-Fi network without your permission. On older routers this feature tends to be turned off by default. Failure to turn on security means that someone can access the internet via your wireless network, which could slow down your use of the network and, more importantly, if you've shared files or folder on your PCs, your documents could be accessible by anyone. Similarly, anyone could illegally download music or movies, and you would be held responsible.

Details of how to enable security in your wireless router varies from one manufacturer to another, but the principles are the same for all. First, turn on Wi-Fi Protected Access (WPA), which encrypts your data prior to its transmission across the network and decrypts it on receipt. You should then specify a password that must be entered into any equipment hoping to connect to your wireless network. Note that most equipment will store this password; if you have to enter the password only once then it's worth using a strong password. Check the user manual to find out how to change your wireless router's security settings. You might also like: [Top 10 uses for Wi-Fi around your home](#)

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Omendata · 2 years ago

Set your computer to static ip which will negate the need to constantly reconnect with dhcp to your wireless router - this is by far one of the best ways to speed up a flaky connection.

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Apparently not if you know anything about re association delays which you apparently dont...

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Guest · 2 years ago

I think people need to realize that the only real speed increases are achieved by bonding channels together. That sounds good on paper but add other routers nearby doing that same thing with only so many channels to work with and you end up with problems. What really needed to happen was either more channels and more bandwidth between them or limit 2.4Ghz band to a single channel system and work to expand another band such as the 5Ghz band for faster throughput. I really think people try and push the 2.4ghz band too far with channel bonding. You now have a default setting to 20mhz bandwidth as default with N mode routers. But that has not stopped many from trying to get around that with 3rd party firmware that works around that and tries to bring back the 40mhz spread. Trouble is that it will not prevent those problems I mentioned earlier. Personally I think it was a mistake to push the 2.4Ghz band to the bandwidth it did. I think staying at or near the single channel max for the 2.4ghz band would have been better. Leaving those that want speed to move up to the 5Ghz band or wait for more options.

The misconception is that speed is everything and in reality its not.

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